Maternal MORTALITY REPORTS

THE COMMITTEE ON MATERNAL AND CHILD CARE was organized in December 1956 and has been responsible for developing and conducting a continuous study on all maternal deaths in California. The study is a cooperative one between the California Medical Association and the California State Department of Public Health.

The committee is composed of obstetricians, pediatricians, general practitioners, pathologists, anesthesiologists and public health officers. It is charged with the responsibility of careful study of each maternal death (a death occurring in any woman who is pregnant or within 90 days of termination of pregnancy). The committee has the responsibility of identifying the avoidable factors in each death, of developing and implementing recommendations for preventing further similar deaths and of preparing periodic reports of statistical analysis of its findings.

The study is on a voluntary basis and permission is first obtained from the attending physician before any investigation is conducted. The committee feels that the material obtained from this study will have great educational use.

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These case reports come from the files of the State Department of Public Health which, together with the California Medical Association, now sponsors the statewide studies of all maternal mortalities. Selected cases are to be presented here from time to time as a matter of interest and illumination to all physicians concerned with the practice of obstetrics. It is hoped that a review of such significant cases will help to improve the welfare of future California mothers.

CASE 1

THE PATIENT was a 38-year-old gravida 5, para 2. She sought initial medical care at one hospital, where she was seen at 4:15 p.m. Her condition at that time is described as "*shocky, cold and clammy, with a feeble, thready pulse and moderate rigidity and tenderness of the abdomen in the epigastrium.*"

Previous medical and surgical history is reported as "not available." The patient gave her last menstrual period as having occurred 20 weeks before, but *she had received no prenatal care.* One week before examination in the hospital there was sudden onset of severe epigastric pain, nausea, vomiting and weakness. Fetal movements had not been felt for four hours.

When the patient was first seen, differential diagnosis of acute pancreatitis, biliary colic or perforating ulcer was entertained. At 4:30 p.m., 10.0 mg. of morphine sulfate, 8 ml. of epinephrine, 1:1000 solution, and intravenous plasmoid (amount not stated) were given. Although the patient was under observation for approximately four hours, there is *no report of any laboratory study.*

There is no further knowledge of the patient's condition and progress for the next four hours, after which *she was transferred to a second hospital.* On arrival there at 8:10 p.m., she was in profound shock with a blood pressure of 30/0 mm. of mercury, no palpable pulse, and a precordial rate of 145 per minute. The pregnant uterus was difficult to outline due to moderate abdominal rigidity and generalized abdominal tenderness, most pronounced in the right upper quadrant and suprapubic areas. There was no gross evidence of infection. Except for slight vaginal spotting, there was and had been no gross external bleeding. Laboratory study of the blood showed leukocytes numbering 32,700 per cu. mm.and a *hemoglobin content of 8.1 gm. per 100 ml.*

General measures to combat shock were begun at once. The first transfusion was started 15 minutes after admission and 5 units of blood were given in the next nine hours. Phenylephrine (Neosynephrine®) was given intramuscularly four hours after admission, and immediately afterward administration of this drug by intravenous drip was begun. Nine hours after admission, intravenous administration of levarterenol was started. Intranasal oxygen was started four hours after admission.

The patient died nine hours and 20 minutes after admission to the second hospital, 13 hours and 15 minutes after the initial examination at the first hospital.

CORONER'S AUTOPSY REPORT (Significant Findings)

1. At least four liters of blood in the abdominal cavity.

2. Uterine pregnancy, approximately five months' duration.

3. Multiple subserosal uterine varices.

(a) One ruptured varix—in an area of pronounced thinning of the uterine wall near the placental site.

COMMENT

1. This maternal death resulted from a most unusual and rare lesion. It serves to illustrate, however, the speed of occurrence and the fulminant nature of certain complications of pregnancy.

2. This fact alone points out the importance and essentiality of adequate prenatal care. Had the patient in the case here reported been receiving it, early investigation of her epigastric pain one week before might have averted the lethal terminal episode, for one suspects that intra-abdominal bleeding of small degree probably started at that time. The patient's omission of prenatal care and delay in seeking medical help undoubtedly contributed to her death.

3. Inadequate initial care. Despite the recognition by the first hospital of shock and a possible intra-abdominal hemorrhage, only minimal supportive and diagnostic measures were carried out. Even these should have included immediate blood study for evidence of blood loss, with subsequent transfusion therapy for replacement and for shock. A simple determination of packed cell volume or of hemoglobin might have been of inestimable value even to the second hospital: A comparison of determinations might have made continuing, grave, intra-abdominal hemorrhage more evident.

Finally, the propriety of transfer of this critically ill patient to another hospital is open to serious question. The patient's life could probably have been saved by early laparotomy at the first hospital.

4. The second hospital recognized the probability of an intra-abdominal hemorrhagic catastrophe. Ample measures to combat shock were carried out there. Presumably operation was progressively postponed in the hope of first correcting the shock, a standard surgical principle. Yet when massive hemorrhage continues, this principle does not apply. Another example is that of ruptured ectopic pregnancy. It must have been apparent that this patient's intra-abdominal bleeding was gaining on the anti-shock efforts—though no *repeated* blood determinations confirmatory of this course are reported. Even in hospital number two, this patient's life might have been saved by a bold recourse to abdominal surgery even in the face of severe shock. It is easy for us to say this in hindsight, but not nearly so easy to do it at the critical time. Possibly the memory of this case may contribute to saving some future mother under similar circumstances.

CASE 2

THE PATIENT was a 40-year-old gravida 3, para 2, whose past medical and surgical history is not significant. During her present pregnancy she was seen by a physician on two occasions, in the second and sixth month of pregnancy. The initial physical examination was reported as normal, including clinical estimation of the pelvis.

The pregnancy progressed uneventfully until labor began spontaneously, two days past the estimated date of confinement, and the patient was admitted to the hospital in early labor. During labor of 14 hours, for reasons not stated "augmentation of labor" was accomplished by the *intramuscular administration of one-half minim of Pitocin®* (oxytocin injection) on two occasions approximately six and a half hours before delivery. Analgesic agents given during the first stage were meperidine, 50 mg., and Phenergan® (promethazine) 12.5 mg., both administered intramuscularly.

During the second stage of labor, analgesia was administered by a physician by intermittent N_2O-ether, and the same agents were used for a "short, continuous anesthesia" for delivery. Deep transverse arrest of the vertex occurred, so delivery was accomplished by *Kielland forceps, with application in the classical manner.* The baby, who weighed 6 pounds 4½ ounces, was delivered in good condition.

With delivery of the infant's head, Ergotrate® (ergonovine) 1 ml., was given intravenously. The placenta was delivered spontaneously four minutes after the baby. *No mention is made of any manual exploration of the uterine cavity.* No undue bleeding is reported up to this point, but immediately after the placental expulsion a loss of 500 ml. of blood occurred, ascribed to "uterine atony." At once, Pitocin® 1 ml. intramuscularly, and Methergine® (methylergonovine), 1 ml. intravenously, were administered and continuous massage of the uterine fundus was instituted. The *cervix* was then inspected and a *4-cm. laceration* was noted (location not specified) and repaired. Although episiotomy had been performed there was further laceration of the vagina

and repair of both was carried out. *Again, there is no mention of any exploration of the uterine cavity.*

Following the repairs, the patient was reported to be in good general condition. But suddenly there occurred what is simply described as a "massive" hemorrhage. The patient went promptly into such profound shock that venous collapse prevented venipuncture to give plasmoid. While a cut-down was in progress the patient died—approximately one hour after delivery of the placenta.

Postmortem examination was not performed.

COMMENT

1. One can only speculate upon the basic cause of maternal death. Such massive, sudden hemorrhage from simple uterine atony is so rare that one strongly suspects uterine rupture or laceration. Such a tear into the uterine vessels could alone account for the massive hemorrhage described—perhaps with unrecognized intra-abdominal bleeding as well.

2. There is no evidence to suggest that uterine rupture occurred during the first stage of labor. Yet it might well have *started* as a result of injudicious intramuscular use of oxytocin as a labor stimulant. In approximately one patient in a thousand, inherent sensitivity to oxytocin is so great that even half a minim will produce severe tetanic uterine contraction and even uterine rupture. Labor stimulation by oxytocin is best accomplished by intravenous use of very dilute solutions (not more than 0.5 ml. in 1000 ml. of intravenous solution) with special attention to extremely low dosage during the first half hour of intravenous flow as a test for sensitivity. Moreover, even thereafter it is important to bear in mind that any change in rate of drip is not fully reflected in uterine activity for about half an hour.

3. It seems likely that uterine rupture occurred during the forceps delivery, perhaps from undue traction upon a cervix not fully retracted, perhaps from the classical application of Kielland forceps. Following such an application, it should be routine to explore the uterine cavity after placental expulsion, in search of a laceration. In this patient, the discovery of a 4 cm. cervical tear and an additional vaginal tear strongly suggested the occurrence of undue trauma during forceps application or during delivery. Hence uterine exploration was mandatory. Whether such exploration might have saved the patient's life by leading to prompt hysterectomy is debatable.

4. Finally, this case reemphasizes the imperative necessity of *not* sending a patient from the delivery room to her postpartum bed for *at least an hour after completion of the third stage.* The vast majority of postpartum hemorrhagic complications occur during this time. Most of them are not as fulminant as in this case, and the *immediate* availability of delivery room equipment, anesthesia and personnel can often tip a grave balance in the patient's favor, whereas the delay occasioned by intermittent patient observation on a ward and transfer back to the delivery room may be the final straw in a sequence of lethal events.

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